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# The Distribution, Density and Seasonal Prevalence of *Aedes aegypti* in West Africa

G. SURTEES [1]

## DISTRIBUTION

### *Regional*

*Aedes aegypti* occurs throughout West Africa from sea-level up to at least 4000 feet (1220 m) in Nigeria and from the coastal swamp zone to Northern Guinea savanna. It breeds both in the cocoa belt of Ghana and in the Northern Ashanti region 1200 feet (360 m) above sea-level in savanna country (Berner, 1947; Surtees, 1958; Boorman & Porterfield, 1957). It is widely distributed in Nigeria. It is a common species in natural breeding-sites in the coastal freshwater swamp zone (Dalziel, 1920; Dunn, 1928; Kumm, 1931) and is also found as isolated populations in village clearings in the southern rain-forest belt (Surtees, 1959b). It breeds in the more open savanna country around Ibadan, 90 miles (145 km) inland, in the Niger Delta, on the higher ground of the central plateau, in northern Guinea savanna and in the northern province of Sokoto (Mellanby, 1956; Boorman & Service, 1960; Hanney, 1960; Boorman, 1961; Service, 1965; and Kuhlow, 1960). It is generally distributed in Liberia (Fox, 1958; Peters, 1957), Upper Volta (Hamon, Sales & Eyraud, 1963) and in Sierra Leone (Lewis, 1956). It is found in urban areas in the western Cameroon mountains (Mouchet, Garou & Hamon, 1960).

### *Local*

*A. aegypti* is not restricted to any particular type of locality. It is found breeding in village clearings in low-lying rain-forest (Surtees, 1959b), in large cities (Surtees, 1960), in mountainous areas (Mouchet, Garou & Hamon, 1960), in cocoa-growing areas (Surtees, 1958), and in Northern Guinea savanna at least 3 miles (5 km) from human habitations (Hanney, 1960).

### *Micro-environmental*

This species has been recorded from almost every potential breeding-site, including crab holes, tree-holes, fallen leaves, rock pools, domestic containers, snail shells, leaf axils, rain pools, wells and latex cups in rubber plantations (Dalziel, 1920; Boorman, 1961; Surtees, 1959b; Fox, 1958). Larvae are found in both clear and heavily contaminated water (Surtees, 1960).

## DENSITY

Although this species is generally distributed in Liberia, it is seldom abundant (Peters, 1957) except possibly in rubber plantations. It was found to be sparse in the Kintampo region of Ashanti (Boorman & Porterfield, 1957); similarly, although it was found breeding in the cocoa belt of Ghana, it was only poorly represented (Surtees, 1958). It was recorded as one of the commonest species breeding in natural sites in the region of Lagos (Dunn, 1928; Dalziel, 1920) and it was one of the commonest species breeding near Ibadan (Mellanby, 1956). It is the commonest species breeding in domestic water containers in village clearings in Southern Nigeria (Surtees, 1959b). Recent work in the northern Guinea savanna of Nigeria has shown it to be one of the commonest tree-hole breeders (Service, 1963, 1965). In one survey, 54% of tree-holes near a village were infested, as were 20% of them 3 miles (5 km) away.

The density of breeding varies with height from the ground. Service (1965) noted that the intensity falls off above 12 feet (3.7 m), and typically this species is more common at ground level than elsewhere (Teesdale, 1955).

## SEASONAL PREVALENCE

In Southern Nigeria, seasonal prevalence was studied in an isolated village. Mean weekly larval density increased over five times during the first four months of the year but declined sharply in the May to July period to about twice the dry-season level. This was followed by a further build-up and then a decline as the rainy season finished. The sharp decline noted came in the middle of the rainy season. This decline is not correlated with climatic

[1] Senior Scientific Officer, Agricultural Research Council, Pest Infestation Laboratory, Slough, England.

factors but is due to larval density. As population density increases, food supplies in domestic water containers are reduced and numbers decline, to be followed by a slow recovery (Surtees, 1959a, 1959b). There are complementary, lagged fluctuations in adult numbers, with an approximate tenfold increase after the first rains and a sharp decrease in numbers in July and August (Boorman, 1960). It is of particular interest to note that, where the species is a tree-hole breeder, there is no decline in numbers in the middle of the wet season (Service, 1965). This may be due to the greater availability of larval food in natural breeding sites.

### SPREAD

Transport and the urbanization of new areas are the major causes of the spread and increased prevalence of *A. aegypti*. Inshore water craft transmit the species from place to place. Inspection of schooners in Guyana showed that 70% were infested; spraying with DDT twice a year was found to ensure control (Charles, 1953). Reinfestation of territory cleared of *A. aegypti* occurred in French Guiana up to 125 miles (200 km) inland in two months. Reinfested loci were connected by motor roads, and all breeding was found in or near to dwellings (Fontan & Fauran, 1961). A similar pattern of spread was recorded in Malaya (Macdonald, 1956). As towns develop, internal airways become more common, and hydro-electric and irrigation schemes are initiated, the spread of *A. aegypti* and its establishment in new areas will be a continual hazard calling for constant surveillance and a greater understanding of both its behaviour and ecology.

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